

Utility Patent Application

CONFIDENTIAL INFORMATION

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EMERGENCY STAIRWAY ESCAPE APPARATUS FOR WHEELCHAIRS

RELATED APPLICATIONS

15 The present invention is a continuation of U.S. Provisional Patent No.
60/444,230 filed on 02/03/2003.

BACKGROUND OF THE INVENTION

20 1. Field of the Invention

The present invention relates generally to a temporary ramp for
wheelchair use and, more particularly, to an engageable staircase ramp
apparatus comprising a hinged flat inclined ramp which folds over a staircase for
use and a wall-mounted self retracting and descension device adapted for
25 attachment to a conventional wheelchair to facilitate a controlled descent.

2. Description of the Related Art

Recent events have illustrated the vulnerabilities those that use wheelchairs have when trying to leave a multi-story building when elevators are not available. The only means for escape is that others carry them, and possibly their wheelchair, down the stairs. Of course, this task is physically difficult, takes precious time and may block the stairway from use by others. These risks are also present to those who may be using an electric-assist scooter, as well. These dangers are not only present in hi-rise buildings, but any multi-story building that employs elevators for egress for wheelchair bound users. This is especially true in hospitals, nursing homes and other locations where wheelchair bound users are prevalent.

A search of the prior art did not disclose any patents that read directly on the claims of the instant invention; however, the following references were considered related:

U.S. Patent No. **4,761,847**, issued in the name of *Savage et al.*, discloses a folding ramp comprising a plurality of rectangular panels adjoined by pivoting hinges for foldable adjustment and provided with a cable hinge system to provide structural support to the ramp;

U.S. Patent No. **4,913,615**, issued in the name of *Ward*, discloses a hinge and ramp assembly comprising an underlying pair of hinge plates and an overlying pair of ramps, wherein the hinge plates support the ramps;

U.S. Patent No. **5,062,174**, issued in the name of *DaSalvo*, discloses a portable ramp for loading off-road vehicles onto pickup trucks, wherein the ramp comprises a plurality of ramp panels joined at lateral edges by hinges for foldable connection therebetween;

5 U.S. Patent No. **5,325,558**, issued in the name of *Labreche*, discloses a wheelchair ramp apparatus comprising a pair of track members coupled by an adjustable connector link that establishes the desired width of the track members;

10 U.S. Patent No. **5,476,155**, issued in the name of *Nakatani et al.*, discloses a stairway lift comprising a guide means formed along a stairway that connects a downstairs level to an upstairs level (and vice versa), the guide means supporting a traction means and a basket carrier;

15 U.S. Patent No. **5,735,088**, issued in the name of *Hashino*, discloses a staircase hoist for wheelchair users, said hoist comprising a hoist carrier plate that the wheelchair is mounted to, guide rails positioned in vertically parallel arrangement and brackets for maintaining the positioning, a drive motor for moving the mounted wheelchair either up or down a flight of steps/stairs;

20 U.S. Patent No. **6,009,587**, issued in the name of *Beeman*, discloses a folding ramp comprising at least two ramp members pivoted together and having an underside with a plurality of bars and/or rods to add strength and structural rigidity to the ramp; and

U.S. Patent No. **6,430,769**, issued in the name of *Allen*, discloses a wheelchair ramp assembly having a keyway joint that is foldably compactible.

Consequently, there exists a need for a means by which disabled individuals in wheelchairs can leave multi-story buildings with or without assistance by way of steps/stairs.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved temporary ramp for wheelchair use.

It is a feature of the present invention to provide an engageable staircase ramp apparatus comprising a hinged and flat inclined ramp which folds over a staircase for use and a wall-mounted self-retracting descension device adapted for attachment to a conventional wheelchair to facilitate a controlled descent

Briefly described according to one embodiment of the present invention, an apparatus is provided that permits people in wheelchairs to egress a multi-story building using conventional stairs. A ramp is provided against the wall of the stairs directly under the handrail. In the event that a wheelchair bound user needs to leave the building and an elevator is not available, the user simply releases a latch and the ramp, attached with hinges to the wall, falls in to place.

The ramp will then cover half or all of each stair tread. Next, the user attaches a VELCRO® strap to the user's body or cable with a hook to the rear of the

wheelchair. The strap or cable is connected to a pre-tensioned and self-retracting reel, fastened to the stairway wall, allowing the user to roll down the ramp in a controlled manner. At the next landing, the user unhooks the cable and repeats the above process on the next set of stairs if needed. Since the invention may only covers one-half of the stairs, the remaining half may remain available to foot traffic.

The use of the present invention allows disabled individuals confined to wheelchairs to quickly leave multi-story building via the stairs, in a manner which is quick, easy, efficient and safe for pedestrians and wheelchair users.

DESCRIPTIVE KEY

10	emergency stairway escape apparatus for wheelchairs	60	quick-release latch
15	typical stairway	65	first motion direction arrow
20	upper landing	70	ramp in deployed position
25	lower landing	75	anti-rollover edge
30	treads	80	motion retarding reel
35	risers	85	upper landing wall
40	ramp in stowed position	90	wheelchair
45	outward wall	95	high-strength cable
50	handrail	100	captive hook
55	hinges	105	second motion direction arrow

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages and features of the present invention will become better understood with reference to the following more detailed description and claims taken in conjunction with the accompanying drawings, in which like elements are identified with like symbols, and in which:

FIG. 1 is an isometric view of the emergency stairway escape apparatus for wheelchairs **10** shown in an installed state in a typical stairway, according to the preferred embodiment of the present invention; and

FIG. 2 is an isometric view of the emergency stairway escape apparatus for wheelchairs **10** shown in an utilized state with a wheelchair.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The best mode for carrying out the invention is presented in terms of its preferred embodiment, herein depicted within the **Figures 1 and 2**.

1. Detailed Description of the Figures

Referring now to **FIG. 1**, an isometric view of the emergency stairway escape apparatus for wheelchairs **10**, according to the preferred embodiment of the present invention is disclosed. The emergency stairway escape apparatus for wheelchairs **10** is installed in a typical stairway **15**, envisioned to be a closed stairwell, such as those found in a commercial multi-story building, encased by fire walls on all sides. However, it should be noted that the emergency stairway

escape apparatus for wheelchairs **10** will work on any straight stairway, and as such, should not be interpreted as a limiting factor of the present invention. In this arrangement, an upper landing **20** is provided at the uppermost portion of the conventional stairway **15**, and a lower landing **25** is provided at the lowermost portion of the typical stairway **15**. A series of treads **30** and risers **35** are provided in a quantity as necessary to interconnect the upper landing **20** and lower landing **25**. A ramp in stowed position **40** is provided along an outward wall **45** such that its width occupies the space from the base of the outward wall **45** to the area immediately under a handrail **50**. An edge of the ramp is secured to the outward wall **45** by a series of hinges **55** as shown. The ramp in stowed position **40** is held captive at the upper landing **20** by a quick-release latch **60**. Upon activation or release of the quick-release latch **60**, the ramp in stowed position **40** will fall in an arc defined by a first directional arrow **65**, and as anchored by the hinges **55**. At the completion of motion, the ramp in stowed position **40** becomes a ramp in deployed position **70**. The ramp in deployed position **70** occupies approximately one-half of the width of the treads **30** and the risers **35**, thus allowing use of the ramp in deployed position **70** on one-half of the conventional stairway **15**, while foot traffic can continue on the uncovered half of the conventional stairway **15**. A lip edge **75** is visible along the outward edge of the ramp in deployed position **70**, provided to prevent any object with wheels from rolling on or off any edge of the ramp in deployed position **70** except

those in contact with either the upper landing **20** or the lower landing **25**. A motion retarding reel **80** is provided on an upper landing wall **85**. The functionality of the motion retarding reel **80** will be described in greater detail herein below.

5 Referring now to **FIG. 2**, an isometric view of the emergency stairway escape apparatus for wheelchairs **10** shown in an utilized state with a wheelchair **90** is disclosed. The wheelchair **90** is located on the upper landing **20** preparing to descend the ramp in deployed position **70**. A high-strength cable **95**, of sufficient length to reach the lower landing **25** (as shown in **FIG. 1**) is
10 deployed from the motion retarding reel **80** which is mounted on the upper landing wall **85** which is perpendicular to the travel path taken on the conventional stairway **15**. The captive hook **100** is hooked onto any structural member of the wheelchair **90**. The motion of the motion retarding reel **80** is such that the high-strength cable **95** will be outwardly discharged in a linear manner
15 (substantially parallel to the direction of the handrail and the stairway) and is not dependent on the weight of the wheelchair **90** and its occupant. Thus, the wheelchair **90** can descend the ramp in a deployed position **70** to the lower landing **25** (as shown in **FIG. 1**) in a controlled manner as defined by a second directional arrow **105**. When reaching the lower landing **25** (as shown in **FIG. 1**),
20 the captive hook **100** is unhooked and a self-retracting mechanism in the motion retarding reel **80** (such as a biased coil spring typical to and well known within

the art) pulls the high-strength cable **95** and the captive hook **100** back up to the upper landing **20** for use by the next wheelchair **90**. It should be noted that while **FIG. 2** depicts a wheelchair **90**, any wheeled vehicle such as a cart, hand-truck, a stretcher or the like can be used with the emergency stairway escape apparatus for wheelchairs **10** with equal effectiveness. It is envisioned that every landing will possess the retarding reel **80** with cable **95** and hook **100**, and along every handrail within the building a deployable ramp.

It is envisioned that other styles and configurations of the present invention can be easily incorporated into the teachings of the present invention, and only one particular configuration will be shown and described for purposes of clarity and disclosure and not by way of limitation of scope.

2. Operation of the Preferred Embodiment

The preferred embodiment of the present invention can be used by the common user in a simple and effortless manner, with minimal training. After procurement of the emergency stairway escape apparatus for wheelchairs **10** it should be installed in the conventional stairway **15** as shown in **FIG. 1**. It should be noted that a complete system as shown must be installed on each section of stairway. For example, a typical high-rise staircase has a landing at each floor, with an intermediate landing in between. Thus, there are two sections of stair treads **30** and stair risers **35** for each floor. Furthering this concept, a five-story

building with the first floor on grade level, would have eight sections of stairway requiring a complete installation of the emergency stairway escape apparatus for wheelchairs **10** as defined in **FIG. 1**. After installation, suitable training for the building occupants should occur on the use of the emergency stairway escape apparatus for wheelchairs **10**. This training should encompass all occupants of the building and not only those confined to wheeled vehicles. This will ensure that help can be provided to all including wheelchair bound visitors who may need to utilize the features of the emergency stairway escape apparatus for wheelchairs **10** without having formal training.

To begin use of the emergency stairway escape apparatus for wheelchairs **10**, a user confined to a wheelchair **90** will enter the typical stairway **15** at an upper landing **20**. The user will first connect the high-strength cable **95** to the rear of the wheelchair **90** using the captive hook **100**. Next, the user will position the wheelchair **90** as shown in **FIG. 2**. Then, the user will lower the ramp in stowed position **40** by the use of the quick-release latch **60** located along the outward wall **45** immediately below the handrail **50**. The ramp in stowed position **40** will drop and become the ramp in deployed position **70** with the aid of gravity. Finally, the user in the wheelchair **90** will guide themselves down the ramp in deployed position **70**. The user is prevented from rolling off the long edge of the ramp in deployed position **70** by the lip edge **75**. Upon reaching the lower landing **25**, the user can unhook the captive hook **100** and associated

high-strength cable **95**, and safely exit the building should the ground floor be reached, or repeat the above process should more stairs exist. The high-strength cable **95** will self-retract in a controlled fashion to the upper landing **20** to allow use of the emergency stairway escape apparatus for wheelchairs **10** by other building occupants that may need to leave and require the services of the same emergency stairway escape apparatus for wheelchairs **10**. It should be noted that half of the treads **30** and risers **35** remain exposed and thus available to foot traffic, and thus the use of the emergency stairway escape apparatus for wheelchairs **10** does not encumber other who may need to traverse the stairs as well.

The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents. Therefore, the scope of the invention is to be limited only by the following claims.